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OUR CONTRIBUTORS

J. GORDON COOK *is a chemist turned journalist. After taking a first-class degree in chemistry and a Ph.D. at Durham University, he joined Dyestuffs Division before the war for research work. Later he worked for a number of years in Central Publicity Department before resigning last March. He is now a free-lance technical writer, and two books from his pen*—Our Astonishing Atmosphere *and* The Fight for Food—*are due to be published this autumn.*

HARRY HUTCHISON *is editor of the* Nobel Times, *Nobel Division's fortnightly newspaper which made its first appearance in June. He was originally in the Research Department at Ardeer.*

EILEEN NORCROSS *is a machine operator in the Wages Department at Trimpell Ltd., the associate company owned jointly by ourselves and Shell. She is 18 years old.*

The Akers Laboratories

By J. Gordon Cook

The Akers Laboratories are something unique in British industry. They exist to carry out pure research—research directed at the discovery of basic scientific principles. Why does I.C.I. spend money and resources on this slow and expensive endeavour? Here is an outline of the reasons behind this policy, with examples of the sort of work that is being done.

Drawings by Wreford

In these fast-moving days any technical industry lives and prospers by its research. I.C.I. is no exception. We spend nearly £10 million a year on the research and development work needed to keep us technically on our toes. Much of this is necessarily spent on applied research—that is, on improving manufacturing techniques, developing better products and generally increasing our efficiency as a chemical manufacturing industry. There is, however, another side of research which is of major importance to us, and that is pure research.

Pure research means, broadly, research that is carried out in an attempt to discover new basic scientific principles. When we engage in pure research we are not trying to improve the wash-fastness of an existing type of dyestuff, make a better transparent plastic, or invent a cheaper process for ammonia synthesis. We are carrying out research to find out how and why things happen: for example, why some plants manage to resist fungus diseases, or why a tiny addition of some particular substance causes two materials to enter into chemical reaction.

This type of research is slow and expensive. Up-to-date equipment and laboratories are needed. First-class scientists must be encouraged to work in fields to which their natural inclinations attract them. They must be allowed to expand their ideas and carry out their experiments in an atmosphere free from day-to-day worries and responsibilities. Even so, years of pure research on any particular line may fail to produce anything of recognisable industrial application.

I.C.I. is a commercial concern which can exist only by being economically successful. It must produce profits by making and marketing chemical products that are cheaper and better than competitors can offer. Why, then, does it concern itself with this long-range pure research?

The answer is that although much valuable invention results from applied research, this depends in its turn on existing knowledge of basic scientific principles. This knowledge is the capital on which firms like I.C.I. continually draw, and without a constantly extending background of this fundamental scientific knowledge the quality of our bread and butter research must inevitably suffer. Traditionally we look to the universities to sustain the academic research on which our modern industries depend for fundamental knowledge. Many major industries in Britain provide funds to encourage such research. I.C.I., for example, has endowed a series of Fellowships at a cost of about £70,000 a year. Help is given to universities in other ways by providing apparatus and equipment that is needed for scientific work.

But there is a limit to the amount of pure research that our universities can do, and in certain lines of vital interest to industry the pace is often inadequate. Within I.C.I. itself, therefore, we now carry out a very considerable amount of pure research on our own account.

A great deal of this is done in the I.C.I. Divisions, but naturally such work to be carried out with enthusiasm must have a potential long-term bearing on Division interests.

The research programmes of the Akers Research Laboratories are designed to tackle broad basic and long-term scientific problems whose solution has too remote a bearing on the needs of any Division to justify it in undertaking them.

Post-war Venture

The Akers Research Laboratories (named after the late Sir Wallace Akers, Research Director from 1944 to 1953) is a post-war venture. Its home is a Victorian manor house called The Frythe standing in 23 acres of land not far from Welwyn in Hertfordshire. During the war The Frythe was used as an Admiralty Research Station, with the result that huts and outbuildings were constructed for workshops, offices and laboratories. The Frythe thus offered convenient accommodation for an industrial research centre when vacated by the Admiralty in 1946 and was acquired by I.C.I. in that year.

Today there are over two hundred people employed by the Akers Research Laboratories, rather more men than women and mostly young. Many of the juniors are working for a degree, a national certificate or other qualifications, through part-time study. Some of the seniors leave to take up university appointments; others are eventually absorbed by the Divisions. In fact, the intention is that most of the research workers should pass through The Frythe as a stage in their careers rather than make research work there a career in itself.

Miscellany of Experts

A visitor curious about people's occupations might be struck with the variety to be found in the Akers Research Laboratories. Among the high proportion who are expert, or learning to be expert, about something, we do not find many of just the same kind. There are mathematicians, chemists, glassblowers, instrument-makers; people who can repair a watch, measure time to a millionth of a second, give a lecture, or grow vegetables and flowers.

There is something important to be gained by this mixing of sciences and skills. Where any two of these meet, an opportunity arises for some quite new thought or technique to spring out.

Two out of four of the people employed work in the actual laboratories, and one of these will have come from a university—probably from this country, but possibly not. There are, or have been, men and women from Australia, Canada and the United States, from Italy, Switzerland, Austria, Holland, Sweden, and other European countries; some permanently, some for a year or two, some for a summer only. They bring new blood and fresh brains to our problems to counter the risk of staleness which may afflict a research station where the personnel remain static for prolonged periods.

The Victorian manor house near Welwyn in Hertfordshire, called The Frythe, which provides the central residence of the Akers Laboratories

Sir Robert Watson Watt, the pioneer of radar, when speaking at the jubilee of a great Government laboratory, said "My own laboratory was burned down after it had been going ten years, and it would be a good thing if such a fire could always be arranged"; and "Men stop doing original research when they reach the age of 35." These are gross exaggerations but contain a seed of truth: change and stimulation are vital to keep a body of researchers in fighting form.

The purpose of this heterogeneous body of scientists can be likened to that of a party of explorers sent to the Antarctic to map the region and study its geology and natural history. It may be that during the course of their work they come across something of obvious practical value—for example, uranium ore. But they do not immediately abandon their planned work and try to exploit their find. Instead, they send word back to base. A properly equipped party is sent out to follow up the discovery, and the original team continues with its exploration.

So the Akers Research Laboratories' scientists are pursuing research in their own broad fields, extending our knowledge in these fields. By making known the results of their work they enable other scientists to follow up research that is of particular interest to them.

To this end steps are taken to ensure that there is a tie-up between the fundamental work at The Frythe and the research work at the Divisions. At regular intervals there are meetings attended by Divisional Research Directors and others at which papers are read explaining in not too technical language the latest advance in this continuous search for more knowledge. And if any particular advance is seen to have practical application, this is followed up at Divisional level either by someone from the Division working for a time alongside a colleague at The Frythe, or possibly by transfer from The Frythe to a Division of a particular group of research workers.

It is perhaps invidious to pick out examples of the sort of successful work that has been done at The Frythe. Much of it is embodied in technical papers already published. But let me quote from two very different fields.

Much study has been given to the microscopic fungi which flourish, usually in the soil, in amazing profusion. Some of these appear as devastating diseases on plants, such as the blight which in the "hungry '40s" brought ruin and depopulation to Ireland a century ago through the complete destruction of the potato crop. Fortunately there are good as well as bad fungi: to them we owe the processes of making bread, cheese, beer and tobacco. From them too comes penicillin, the almost miraculous healer.

Hall and main stairway at The Frythe

The life stories of fungi are thus well worth understanding, and one very active fungus, discovered by members of the Akers Research Laboratories, has been studied in great and rewarding detail. A thousand-millionth part of an ounce of its product *griseofulvin* can be detected through effects on other fungi. The Frythe botanists have traced its movements through the stems, roots and leaves of beans and can assay the griseofulvin in the tiny drops of moisture which form on the top of an oat shoot. Chemists from The Frythe and Blackley have solved the structure of this substance—a problem something like an immensely difficult crossword puzzle whose clues are provided by delicate and carefully chosen experiments on minute amounts of material.

A second example may be taken from the physical field. Most pure materials with which we are familiar, such as water, sugar, common salt and quartz, form crystals when they are cooled or evaporated from solution. Others of long, string-like shape like 'Terylene' or nylon may become crystalline in parts.

Much attention has been devoted in the past to such kinds of crystallisation. But there is yet another kind of pure material which seems not to be capable of crystallising at all: instead these liquids on cooling simply become more and more viscous. They can then no longer be poured from a vessel, and they end up as glassy solids, usually rather brittle. Window glass is in fact an example, though it is not altogether typical and has to be studied at an inconveniently high temperature.

The Akers Research Laboratories' physicists and chemists have prepared a number of these glasses which at the temperature of boiling water are freely pourable and at that of ice are quite hard, so that they can be watched and measured in the process of gradual change from liquid to solid. One fact which stands out is that the apparent hardness may depend very much on the time given to measuring this property.

We generally think of indiarubber as a soft material —but place a piece of mild steel on top of a piece of indiarubber and give them a very sudden blow by setting off a small explosive charge against the metal; then examine the steel. We shall find that the rubber has stamped out an impression in the steel, like a hard die on a copper coin. The explosion allowed only a few millionths of a second, which is not enough for the particles of the rubber to move and display ordinary softness. The steel particles move more quickly and therefore behave as a softer material.

What may be the industrial future of these and the many other experiments in progress at The Frythe we cannot tell. Perhaps, however, we may remember that the distinguished scientist Karl Pearson, writing sixty years ago, gave as an example of a discovery with no apparent practical value, the electromagnetie waves which had then recently been described by Hertz. We now call them radio waves, and their use for radio and television sets, radar and the radiotelephone involves industries which now earn hundreds of millions of pounds a year.

To be fair to Pearson, he added that it would be a bold man who dared to say confidently that even so unlikely a discovery might not revolutionise our lives in a generation or two. How right he was!

One man and his job—34

ROAD-TANKER LOADER

A BELL sounded. Jim Hibberd, short and grey-haired, in blue overalls, goggles and red P.V.C. gauntlets, stooped to put over a lever and stop the flow of caustic liquor.

We were standing on the main loading platform at the Winnington Caustic Plant. Directly beneath us on the weighbridge was one of Alkali Division's road tankers. Towering above our heads on either side were two huge stock tanks from which some twelve tons of caustic liquor had been flowing through pipes and filler hose into the vehicle's tank.

Standing besides the weighing machine was Jim Hunt, the man whose thumb had been on the warning bell button. First he had seen the unladen weight of the tanker automatically recorded. Then, as the indicator moved round to the capacity weight, he had sounded the bell to warn Jim Hibberd above to turn off the tap.

Jim pulled up the heavy filler hose, and after allowing it to drain he laid it aside. So much for that, I thought to myself.

But Jim's job was not yet finished. From somewhere he produced a long steel rod with a can on the end. This, he explained, was a dip can. Down it went into the tanker, then up again with a sample of liquor. Jim poured it into a bottle. Then, taking his bottle, he bustled down the ladder and into the weigh house.

He emptied his sample bottle into a measuring jar and took a reading from the hydrometer. A thermometer gave him the temperature. Next minute he was scribbling a label with the customer's name and the details he had just recorded. That sample would now go to the Plant Laboratory for further tests, and the data would be passed to the Distribution Department for costing purposes.

The specification of this load of caustic liquor was a hundred twaddell, I was told, twaddell being a convenient measure of density and so named after the inventor of the particular kind of hydrometer that Jim was now using.

Outside by this time Jim Hibberd was scaling the tanker's small steel ladder to close the hatch cover firmly. This was important. So, too, was the next operation—hosing down the outside of the tanker with hot water to wash away any caustic liquor that might have spilled. A splash in the eye because of a carelessly closed hatch could be serious for an unfortunate cyclist or pedestrian.

The tanker moved off, bound for a Lancashire firm of textile printers and dyers who would use the liquor in their process. Other loads that morning were being sent to paper manufacturers for use in pulping; soap and rayon makers, and other industries for a variety of purposes.

A harmless gust of summer breeze as I followed Jim up to the platform to begin the next loading prompted me to ask what it was like working on the platform in winter.

"It's pretty nippy at times, but the main trouble is freezing," said Jim. "The liquor gets frozen in the pipes and taps and has to be melted by playing steam on the outside."

I fingered the protective glasses I had been given to wear, and asked: "Have you ever had caustic in your eye?"

"Only once, and I knew about it for a couple of days afterwards, even though I bathed it straight away. Now I believe in making sure it doesn't happen again," Jim replied.

It was then that I learned the purpose of the small red cabinet by the handrail. Inside were two bottles: one containing ammonium chloride for treating skin burns, the other known colloquially as "eyewash"—a green-coloured solution of phosphates.

Jim was nearing the end of his shift; a shift that had begun at 6 a.m.

His first responsibility is to see that the tanker to be loaded contains no trace of any other substance it might have been carrying and that the lining of the tank is not of a material likely to react with caustic.

The problem does not arise with Company wagons, but vehicles of outside contractors have to be watched carefully. Only vigilance recently prevented Jim from loading twelve tons of caustic liquor to waste in a tanker carrying treacly remains of a load of resin.

Another wagon trundled on to the weighbridge. Jim tilted back his safety helmet and wiped his goggles. "Like the job?" his eyebrows lifted slightly. "Well, after eleven years I feel it sort of belongs to me." I.G.

Jim Hibberd

Information Notes

THE FOUNDATIONS OF INDUSTRIAL SECURITY

By Viscount Chandos

Five pillars of a sound industrial policy are here outlined by Viscount Chandos, director of I.C.I., chairman of Associated Electrical Industries Ltd., formerly Secretary of State for the Colonies. The article is reprinted by kind permission of the "Sunday Times"

MUCH attention, and rightly, is now devoted to the subject of labour relations in industry. There is a tendency, however, to think that this or that measure is the talisman. The public are led to believe at one moment that profit-sharing, though loosely defined, is the answer, at another that shareholdings by workpeople in the company in which they are employed will solve it all, at another that a contract for an annual wage on American lines will be a great stabilising factor, and so forth.

There is, of course, no single solution to the human problem; for that matter there never can be a solution. It would be just as unrealistic to suppose that some additions to the marriage contract—as a result of a joint committee made up of men and women, with the collaboration of the Church and the Inland Revenue—would impart that stability to the marriage vow which sometimes it appears to lack.

The Main Foundations

Most of the measures which I have mentioned can only be the coping-stone or the cement of an edifice which has been built on deeper foundations. It is worth examining, first, what these should be. I have expressed it very often, in speech and writing, by saying that the main foundations are these:

Industrial policy must be framed—

1. *To aim at continuity of employment for everyone on the books of the company, so to speak.*
2. *To give a fair reward and good incentives for a good day's work.*
3. *To make the career open to talent.*
4. *To see that the conditions under which people work should be as light and cheerful as we can make them.*

These may sound mere platitudes, but this impression may be dissipated on examination. The statement that continuity of employment should be the first object of industrial policy means that such matters as the distribution of dividends, the amount of retained profits, the modernisation of the plant, the improvement of its powers of competition, should be judged first on the criterion of whether the policy on these subjects underpins the employment of those who are on the shop floor. In my industrial life many awkward decisions have been made easy by applying this simple touchstone.

The second point, the fair reward for a fair day's work, and proper incentives, is bound up in such subjects as piece-rates. Incentives require to have a close personal impact, and many profit-sharing schemes are too remote from a man's daily work. The group piece-rate, which may involve twenty-five or fifty workpeople, sets a standard which, if it is exceeded, means that all the workers in the group get bonuses on their basic pay. They do not suffer gladly those who slow down the work, and they see closely the result of their efforts in the weekly pay-packet.

Tradition of Confidence

Of course, the principal cause of friction will be on rate-fixing. Again, there is no answer to this problem except that of a long tradition of confidence, built up between the man on the shop floor and the rate-fixer.

Where a new machine is installed, or a new process invented, or materials handled more cheaply by mechanical means, how much of the increased profit or lower cost should be passed on to the operative and how much to those who have provided the money? That every operative must share in the increased production through

the group piece-rate is unquestionable: the degree is more difficult, and no hard and fast rule can apply.

The third point is the career open to talent. This hardly needs elaboration, but it is one of the most important of all subjects in industry. No obstacles must be put in the way of promotion. On the contrary, within the big companies, or by co-operation among the smaller ones, education must be available by which those with ambition are enabled to train themselves for the higher responsibilities of management and ultimately of direction.

Lastly, the mentality which paints a wall a dark chocolate colour because it won't show the dirt must be banished from industry. The thing to do is to try to prevent the dirt. If this is not wholly successful, when the wall gets dirty it must be repainted. Such a policy pays handsome but unseen dividends. A lawn and a few flowers outside a factory are hardly of less importance than a good layout of the tools.

Such are four of the pillars of industrial policy. It is now worth while to turn to some of the panaceas which are currently put about: most of them are very far from panaceas, but most have their place in a scheme of industrial relations.

Limited Application

Profit-sharing has only a limited application, for the reason that, as a rule, it is too remote from the work of the operative either to give him much more interest in the business than he would gain out of a piece-rate, or to give him that personal feeling of belonging to a society or a company or a team which we want him to feel.

Profit-sharing in the strict sense of the words is fully effective only in stable businesses, where the ratio between the numbers employed and the value of the product is high, for example in a publishing business, where the value of the book is out of all relation to the amount of labour expended in printing it.

The main object of profit-sharing, as the term has come to be used, as is that of stock-ownership by the employee, is not an "incentive," but is to increase the feeling that the opposition of the "we" and "they" of industry is being broken down. It is also thought that the owners of shares will not wish the company to be knocked about by irresponsible hot-heads and agitators. The family man will attend the union meeting more often.

A Psychological Mistake

Lastly, I believe from my early experience in industry that one of the great psychological mistakes which we make is to have too short a contract of service between a company and its long-service men. I do not believe at all in going as far as a guaranteed wage for a year, which would be far too inflexible: certain stresses might break it down.

What I do believe in is that for every year's service over a certain period the worker should receive a week's extra notice. For example, in the engineering industry the contract between the employer and the employed is one guaranteed week: the worker is, so to speak, at a week's notice, and of course nothing, whether it be a railway strike or a power shutdown, alters the employer's obligation to pay that guaranteed week.

I would prefer to have an arrangement, though it is certainly not without dangers, by which a man who had been on the books of the company for (say) two years received one extra week's notice, that is one extra guaranteed week's pay, for every year that he remained on the books of the company. Psychologically it is completely wrong that a man who has been in your employment for ten years should be on a week's notice. It is quite true that in present conditions of employment you would be giving very little to the workman which he has not got already, but what you are doing is saying: "If you are loyal to me, I will be loyal to you, come rain or fine."

My Own Experience

I had an example of this in my own experience. When the power shutdown took place, we refused to apply the contract to our own workpeople and give them a week's notice. On the contrary, we said we would continue to pay a full wage to everybody in the company as long as we could reasonably afford it. This was a fairly bold gesture in a company whose wages bill was at that time about half a million pounds a week.

I still think the psychological effects were profound: they may have been forgotten by now, but when the power was restored the works committee in a certain very large works passed a resolution to thank the company for the transport they had provided to bring people to work, for the arrangements they had made to try to keep the work going, and for the wages they had paid when no work could be done. They pledged themselves unanimously to make up the production which had been lost. They kept their pledge.

The Fifth Pillar

So I would add, in conclusion, a fifth pillar of industrial policy, which is *longer notice for longer service.*

But, when all is said and done, it must be our constant thought to see that humanity and imagination and sympathy and humour—and I believe sometimes in giving before you are asked—are part of our daily bread. As long as human beings are what they are there will be plenty of troubles and plenty of disputes, and neither side will always be in the right. You cannot get over these difficulties by measures taken at the last moment: you will get over them only if faith and confidence have been built up day by day and year by year.

DEFENCE AGAINST THE LOCUST

By George Ordish (Central Agricultural Control)

Since Biblical days locusts have been a plague to mankind, causing immense damage to the crops on which they settle. But science now produces a more effective defence against this scourge than the time-honoured remedy of lighting bonfires and making a noise.

FOR thousands of years locusts have been a plague to mankind. They are mentioned in the Bible; in fact they were one of the plagues of Egypt, and the Aztec monuments show that in America locusts were a considerable cause of trouble to the aboriginal inhabitants. For thousands of years mankind has been fighting this plague; but it is only within the last fifty years that he has been able to master it, and this is because scientific method has been applied.

A swarm of locusts beginning to settle

There are two fundamental methods of approach to the problem. The first and the ultimate aim of civilised society must be to prevent locust attacks occurring at all, and this is the chief end to which efforts are directed. The second is the immediate method, which is to destroy locusts when they are threatening.

We all know how devastating these attacks can be. The cloud of flying locusts appears on the horizon. The time-honoured remedy is to light bonfires, make a lot of noise, and hope to drive them away. But even if this action is successful it succeeds only in driving the locusts on to neighbours' land, and the loss sustained by the community is as great as ever.

There are three modern methods of attack—although when I say modern I must point out that the first method has been in use for at least thirty years. It is to offer the locusts poisoned food. Flying swarms of mature locusts settle for the night, and they probably feed voraciously at dusk and before they take off in the mornings. A bait made of bran or crushed maize or a similar product and benzene hexachloride or BHC is a very effective poison. The difficulty is, of course, to get it distributed. One does not know where the locusts are going to settle or when.

The second method is to kill the young locusts as they hatch. The swarms of adult locusts can do a great deal of harm, but the worst harm they do is the laying of thousands of eggs. These eggs soon hatch into flies which, if they find suitable food, grow into hoppers. These are extremely voracious during their growth period, and at this time they are extremely susceptible to these benzene hexachloride baits and are very easily killed.

Consequently the control of locusts aims as far as possible at killing the swarms of adults as they settle, either by means of baits or with direct dusting of benzene hexachloride, or killing the young as they hatch from the eggs by the same means.

I referred, however, to three methods. The third is the direct spraying of flying swarms while they are in the air. This has proved very effective in many parts of Africa.

Aircraft such as the De Havilland Rapide, the Anson and similar models are fitted with air filters to keep the locusts out of the engine and with windscreen wipers so that locusts which fly against the windscreen do not blind the pilot. These machines can fly over a swarm and spray it with concentrated insecticides, of which benzene hexachloride is a favourite. They are proving one of the best methods of locust attack in Africa and may well find application elsewhere.

A CHEMICAL FOR BETTER ROADS

By K. A. Lunn (Dyestuffs Division)

A big factor in road construction is the bond between stone and bitumen binder. If this bond is satisfactory, surface dressings of stone are not stripped off by the traffic. Here is the story of a new technique.

ROADS are very much in the news today. Before the war there were two and a half million motorists. Today there are four million. And to meet these increased demands the Government has announced a huge capital programme to be spent on road improvements over the next four years.

But, you are no doubt asking, where does Dyestuffs Division come into all this ? What have dyes got to do with granite chips and tarmac?

The chemists who manufacture and do research on dyestuffs found out long ago that it was impossible to confine their activities simply to colouring matters. Many of the compounds they discovered, while proving of no interest as dyestuffs or in dyeing, were found to be valuable as textile finishing agents, rubber chemicals, pesticides, antiseptics or drugs. For example, the discovery by Dyestuffs Division of drugs to combat malaria shows the importance of these "sidelines" of dyestuffs chemistry.

One of the most important classes of non-dyestuffs products now made by Dyestuffs Division is that of synthetic surface-active agents, used today on a vast scale as detergents, emulsifying agents, dispersing agents, wetting agents and so on.

. . . these surface dressings

Among these surface-active agents is *cetyl trimethylammonium bromide*, a member of the so-called cationic class. This particular product proved to have many valuable properties. It was found, for example, to be a powerful and very safe bactericide, and in a highly purified form it is marketed under the name 'Savlon' as an antiseptic for the home.

But to return to the roads. One of the principal methods of surfacing roads is the spraying of a layer of binder (tar or bitumen), on which stone chippings are spread and then rolled in. These surface dressings have in the past often failed through rain loosening the stone chippings from the binder, and the chippings are then stripped off by the traffic. To avoid these failures surfacing operations have usually had to be restricted to fine weather, and this has often meant costly delays.

It became obvious that if it were possible to discover a method which would enable surfacing operations to go on whatever the weather, the saving would be very considerable indeed.

The chemists of Miscellaneous Chemicals Service Department, Dyestuffs Division, were among the various people actively working on the problem, and they discovered that a very effective solution of the difficulties lay in the use of none other than *cetyl trimethylammonium bromide* (not, of course, the pharmaceutical quality of this substance).

Large-scale trials of the use of this agent, carried out by the Road Research Laboratory of the Department of Scientific and Industrial Research, confirmed the value of this discovery, and a special preparation of *cetyl trimethylammonium bromide*, consisting of a 28% solution in light creosote, was marketed under the name of Adhesion Agent DS2274 or 'Adhevia' T, as it is now called.

'Adhevia' T acts by displacing water from the wet stone surface, at the same time making the surface more receptive to the tar or bitumen binder. Afterwards not even heavy rain will weaken or disrupt the firm bond.

The two recommended methods of using 'Adhevia' T are the pretreatment method and the sprinkler method. In the former, the stone chippings (not necessarily dry) are treated with 'Adhevia' T diluted with more light creosote, using between one and two gallons of an 8% solution for each ton of stone. The treatment may be carried out in a concrete mixer on the site, or at the quarry.

The sprinkler method consists in spraying a thin film of the diluted 'Adhevia' T on top of the hot, newly laid binder at the rate of about one gallon of 8% 'Adhevia' T (in light creosote as before) per 150 square yards, followed by the application of stone chippings at the normal rate.

The cost of the treatment using the sprinkler method works out at around 0·67d. per square yard of road laid—a very modest price to pay as insurance against premature failure of the road surface and against costly interruptions to surfacing produced by unsettled weather.

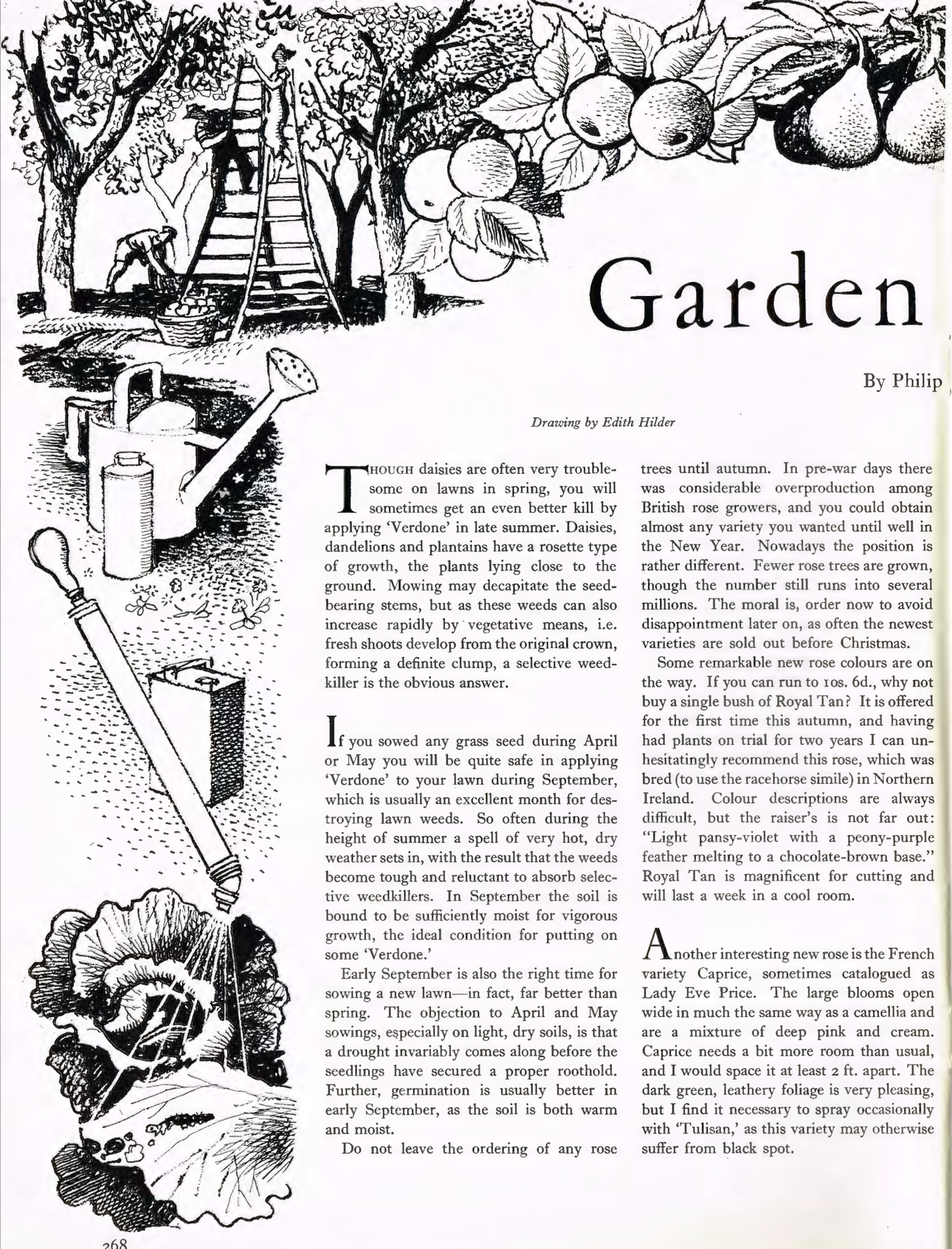
The pretreatment technique comes a little more expensive—around 1½d. per square yard—but this is still a very reasonable price.

So next time you are cruising along in your car and hear the granite chippings rattling up inside the mudguards, you may with indignation think—whether in the capacity of motorist, ratepayer or taxpayer—that perhaps somebody is practising false economy by not using 'Adhevia' T.

Garden Notes

By Philip Harvey

Drawing by Edith Hilder



THOUGH daisies are often very troublesome on lawns in spring, you will sometimes get an even better kill by applying 'Verdone' in late summer. Daisies, dandelions and plantains have a rosette type of growth, the plants lying close to the ground. Mowing may decapitate the seed-bearing stems, but as these weeds can also increase rapidly by vegetative means, i.e. fresh shoots develop from the original crown, forming a definite clump, a selective weed-killer is the obvious answer.

If you sowed any grass seed during April or May you will be quite safe in applying 'Verdone' to your lawn during September, which is usually an excellent month for destroying lawn weeds. So often during the height of summer a spell of very hot, dry weather sets in, with the result that the weeds become tough and reluctant to absorb selective weedkillers. In September the soil is bound to be sufficiently moist for vigorous growth, the ideal condition for putting on some 'Verdone.'

Early September is also the right time for sowing a new lawn—in fact, far better than spring. The objection to April and May sowings, especially on light, dry soils, is that a drought invariably comes along before the seedlings have secured a proper roothold. Further, germination is usually better in early September, as the soil is both warm and moist.

Do not leave the ordering of any rose trees until autumn. In pre-war days there was considerable overproduction among British rose growers, and you could obtain almost any variety you wanted until well in the New Year. Nowadays the position is rather different. Fewer rose trees are grown, though the number still runs into several millions. The moral is, order now to avoid disappointment later on, as often the newest varieties are sold out before Christmas.

Some remarkable new rose colours are on the way. If you can run to 10s. 6d., why not buy a single bush of Royal Tan? It is offered for the first time this autumn, and having had plants on trial for two years I can unhesitatingly recommend this rose, which was bred (to use the racehorse simile) in Northern Ireland. Colour descriptions are always difficult, but the raiser's is not far out: "Light pansy-violet with a peony-purple feather melting to a chocolate-brown base." Royal Tan is magnificent for cutting and will last a week in a cool room.

Another interesting new rose is the French variety Caprice, sometimes catalogued as Lady Eve Price. The large blooms open wide in much the same way as a camellia and are a mixture of deep pink and cream. Caprice needs a bit more room than usual, and I would space it at least 2 ft. apart. The dark green, leathery foliage is very pleasing, but I find it necessary to spray occasionally with 'Tulisan,' as this variety may otherwise suffer from black spot.

For a third choice the American variety Sutter's Gold should be given a trial. Here is a really up-to-date rose to show to anyone who says that modern roses are scentless, or nearly so. Sutter's Gold was introduced as recently as 1950 and was named to commemorate the centenary of the discovery of gold at Sutter's Mill in California.

Sutter's Gold has superb reddish-gold buds which open to high-centred soft yellow blooms, flushed pink. The long stems make this rose admirable for cutting, and the fragrance is very strong. If one wants to be supercritical I suppose the open blooms are a little disappointing after those gorgeous buds which are hard to parallel in any other rose, new or old.

Do you pick your apples properly? This may seem an impertinent or shall I say elementary question, but careless picking is bad for both the actual fruits and the tree proper. *All fruits must be gathered when absolutely dry.*

If apples are picked too soon they invariably shrivel and there is a deterioration in flavour. You can easily tell whether an apple is ready to pick by raising the fruit with the palm of the hand and turning gently. It will part readily from the spur only if just right for gathering. Apples are, of course, picked with the stalk adhering. If the stalks are allowed to stay on the tree they provide a source of entry for brown rot disease, which has so far proved unresponsive to spray treatment. Further, apples devoid of stalks usually decay more quickly.

Never throw apples into your picking basket. A bruised specimen will soon decay. Lastly, do not store diseased apples. They are best destroyed, as left on the tree they will simply carry on the disease to the following year.

Iris unguicularis, or *stylosa* as it used to be called, is a singularly unattractive name for a most beautiful, easily grown plant which blooms at intervals from late autumn to the end of March. The fragrant flowers are bright lilac and delightful for cutting if picked in the bud. It takes a year or two to settle down and in my experience is quicker to re-establish itself if planted in September rather than March, as is sometimes recommended. *Iris unguicularis* needs plenty of moisture until it has formed fresh roots, though once established it prefers a dry spot. September planting obviously ensures cooler soil conditions than March.

Catalogues always tell you that this iris should be grown under a south wall. They are absolutely correct, as although it is quite hardy the flowers are easily spoiled by frost, and the plant blooms longer and more freely with the protection of a south wall. Slugs and snails are the only pests of any consequence.

Scottish Gems

By Harry Hutchison (Nobel Division)

Colour photographs by Ivor Ashmore

There is a hidden beauty in the foreshores of Britain if you know where and how to look. Here is the story of a chargehand fitter at Ardeer Factory of Nobel Division, whose hobby is working with the semi-precious stones of Scotland such as agate and onyx.

MR. ROBERT WATT has been employed in the trades workshop of Ardeer Factory since 1939. He has really two jobs. One week he is chargehand turner and fitter; the next week he is the acting foreman on the night shift. But every week during his leisure hours he is a geologist seeking semi-precious stones—a skilful amateur lapidary who cuts and polishes his discoveries until they show all the beauty of pattern and delicate colourings of agate, onyx, sardonyx, jasper, smoky quartz and sometimes cornelian.

At 53, bachelor Mr. Watt has great experience of his unusual hobby, and his reputation as a gemmologist and lapidary grows bigger. His interest in archaeology and geology is of many years' standing, but the great enthusiasm for semi-precious stones began only some five years ago. Then while he was on holiday at Montrose he wanted to visit a vitrified fort at Brechin. Nobody could tell him exactly where it was to be found, and the likeliest local authority diverted his interest to something much more exciting. This man showed Robert Watt some polished agates.

"I could take you to a place where you'll find them," he promised. "Get a hammer and chisel, and we'll see what we can get."

They rambled over the sea-washed rocks near Montrose, and Mr. Watt's guide pointed out odd, unattractive, warty-looking pebbles which were embedded in these rocks. With a geologist's hammer and a seven-inch cold steel chisel—tools of the trade which Mr. Watt now carries everywhere with him in an old gas mask holder—he prised these pebbles, not unlike old wizened potatoes, from their rocky beds.

That started the hobby which has become all-absorbing and explains why every free week-end in summer Mr. Watt's car leaves Ayrshire and races to the east coast, where he rambles over the shingle beaches and the rocks of the foreshore at Montrose and Arbroath. On the shingle beaches which have been disturbed by a receding tide he sometimes picks out small gnarled pebbles which show a translucent pink tinge at the edges. These he pops into his bag for further examination, because once the uninteresting skin has been ground off, magic may be revealed. Most often the pebble you pick up and throw to skim the waves contains no core of unsuspected beauty. A few, however, are agate or sardonyx inside, and these the expert can spot with some certainty.

This and much more I learned in the sitting room of his home in Saltcoats one Saturday night when the south-west wind drove a storm of rain against the windows. In that room was strange excitement as he opened a little wooden case and spilled from it more than a hundred stones, no two of them precisely alike.

"Of course," he explained, "they're different when I get them. This beauty is a whole lot more than skin

A collection of cut and partially cut agate and onyx stones

deep. In fact, if you judge from the appearance of the skin you'd never get gemstones at all."

On the table were ovals with bevelled edges and small convex discs of agate and onyx, with here and there some lozenges of sardonyx and jasper. In the collection was one fragment of cairngorm—the crystalline stone which, when cut and polished, is used to embellish the ceremonial plaid brooches and stocking knives of Highland garb.

Although Mr. Watt likes the cairngorm, his favourite stones are not the crystalline gems, but the stones which only yield their charm after he has worked on them slowly and most skilfully. He intends to make a large collection of agates because he has not yet found two of them to be the same. Even in the colour range of smoky milky grey and blue, he showed me many examples and pointed out the variety of concentric patterning which gave the stones their appeal and distinction.

I picked up some of them in my hand to look carefully when he advised me to hold them to the light. That was good advice, because their full colouring and banding become more attractive; some parts passed more light than others and approached, but did not quite achieve, transparency. The reasons for this are simple enough. All the stones collected are forms of quartz banded by the circumstances of their formation and differently coloured by impurities.

Perhaps as lovely as the agates were the many examples of onyx with thin parallel and straight bands of differing colour. Sardonyx has browns and reds of sard in its constitution.

All this was fascinating, but how the stones were produced from ugly wizened brown or bluey-grey flat spheroids was puzzling me. Mr. Watt explained.

First of all he covers his pebbles with water, and that sometimes reveals translucent patches which hint at the nature of the core once the skin of celadonite is ground off. Any flaws and cracks in the pebble are more easily seen when the stone is wet, and the time spent cutting and polishing a flawed pebble is time lost. When good stones have been selected the great work of patience begins.

"Where's your working bench, and do you need a lot of special stuff?" I asked. "Wait a minute and I'll bring it in," he said.

In much less than a minute he carried in a neat, strong working bench. It was made from a stout packing case and measured about a yard in length, two feet in height and one and a half feet in width. On a lower shelf was a small electric motor that developed $\frac{1}{4}$ H.P. to drive a vertical spindle which passed upwards to the top working surface of the bench. On the spindle was fixed the cutting disc or polishing disc, an assembly that looked like the revolving top of an electric gramophone. That was lapidary equipment which had contrived the stone beauties in the jewel box.

"Now," said Mr. Watt, "I'll show you how to cut a pebble."

He placed a steel disc about one-sixteenth of an inch thick on the spindle and tightened the holding nut. In front of this disc was a hinged gate of wood, and on it in the right position an uninteresting rough washed pebble, a little larger than a walnut and less handsome, was firmly stuck with pitch. He swung the gate forward until the edge of the steel disc touched the middle of the pebble. A light spring pulled from the back of the bench held the gate in this position.

At hand Mr. Watt had a jam jar filled with carborundum paste. He pushed a three-point plug in a wall socket and switched on. His motor started, and immediately he spooned carborundum paste round the stone in the path of the disc's cutting edge.

This was not quick work, he explained. A very hard stone would take about one and a half hours to cut through. The job must not be hurried, or the cut would be jagged and liable to cause splintering of the stone. Nor was the job quiet. Indeed, with a very hard agate the cutting disc could cause a steady strident noise which some people (not lapidaries!) found blood-curdling and unpleasant.

I did not find the noise insupportable, but my listening was limited to twenty minutes, because very thoughtfully Mr. Watt had prepared the experiment and the pebble he had mounted was already three parts cut through. When the cut was complete he took off one half of the pebble to show me the revelation. The pattern of agate was seen, although I had to confess that it did not have the silky lustre and shimmer of changing light shown by the examples in the box.

"No wonder!" he laughed. "The job's hardly started. There's two or three hours' polishing to be done, but I'll work on this for ten minutes or so and you'll see a difference."

As he removed the cutting disc he told me that when he started on that wheel some twenty pebbles ago it had measured eight inches in diameter. Now its measure was barely six inches, and soon a new disc

(*By courtesy of Messrs. Hamilton and Inches Ltd., Edinburgh*)

Dirk, shoulder brooches and skean-dhu in which cairngorms have been used for gem settings

would be needed. He fixed another disc to grind off the rough edges, then he demonstrated the polishing.

For this job a half-inch thick rubber disc carrying a moistened sheet of No. 7 carborundum paper was used. The stone was held firmly by hand on the surface of this revolving disc, and every few minutes he would rest the stone. "Too hot to hold," he'd explain; but according to this knowledgeable man this very heat assisted the process of polishing.

In twenty minutes the surface showed much enhanced character and now resembled the stones in the box.

Mr. Watt then spoke of the technique. My piece was merely a sample of the single cut. Stones in the box were slices from the pebble, and these quarter-inch thick ovals had to be most carefully cut and polished on both sides. For jewellery the edges had to be ground off, and there were traditional forms. Most popular were the oval discs which in earlier times were caught in gold or silver bands and formed neck pendants. Another much-practised cutting of agates and some onyx was "en cabochon," which yields a convex oval. Flat hexagons and lozenges of sardonyx were at one time bound in silver as cuff-links.

Nowadays these semi-precious stones are not much used in traditional Scottish jewellery. That does not worry Mr. Watt, whose interest is in the stones themselves and the attractions they reveal once his skill has been exercised on them.

He likes to hold his ovals of agate against sunlight and admire the misted translucence of colours and their indescribable range of pattern and charm. It is, he will tell you, the perfect hobby.

"It keeps me outdoors in the summer collecting pebbles, and in the house all winter cutting and polishing."

This is a game for the patient man. Mr. Watt will confide that he has lots of patience, and he will recount a story told by Professor Gordon Childe, who, extolling the craftsmanship of the flint arrow-head makers, commented dryly that they had leisure then because there was no cinema. Robert Watt's hobby is in this same tradition.

HYACINTHS

By Philip Harvey

With its wonderful scent and beautiful bloom, the hyacinth is easily the best of the spring-flowering bulbs. Now is the time to plant, and here are the details of just what to do.

Colour photograph by courtesy of Associated Bulb Growers of Holland

Does the growing of bulbs in bowls, pots or pans in a living room call for any special skill? The answer is no, though with some reservations. It is often forgotten that bulbs, whether grown indoors or in the garden, contain next year's flowers in embryo. Obviously the indoor bulb requires moisture, light and steady growth to ensure first-quality blooms, but "green fingers" are not really necessary.

Do not buy cheap lots of bulbs. They *may* be satisfactory, but indoor space is limited and you cannot afford to take risks. Those classified as "top size" give the best results and should be stored in a cool place until you are ready to plant. The next step is to choose the right type of container. Bowls without drainage holes are very popular but are only suitable for bulb fibre. Their great advantage is that there is no staining of sideboards, window-sills, etc., as often happens with a pot and saucer.

An expensive bulb bowl will not give you any better flowers than a moderately priced container. Blue and white china or terra-cotta bowls are ideal, similarly bronze and copper bowls. Old baking tins are also excellent, provided they are deep enough. Containers should be not less than four or five inches deep for hyacinths, daffodils and tulips; three inches is about right for crocuses, snowdrops, scillas and smaller bulbs generally. Shallow two-inch bowls must only be used for the smallest bulbs.

Always soak your bowls well before adding the bulb fibre. Present-day plastic bowls are specially suitable for fibre, as they do not dry out as rapidly as old-fashioned pottery. Good bulb fibre should be a pleasing light brown. Half a bushel will be sufficient for about six bowls and can still be obtained for under ten shillings.

Bulb fibre consists of coconut fibre, dust-free peat, and oyster or other shell, plus charcoal to prevent the mixture turning sour.

Always soak the fibre thoroughly before use. Light sprinklings are useless, so immerse the mixture in a bucket of water for twenty-four hours. You can tell when it is ready to use by squeezing with the fingers. If it sticks, it is still too wet; should it fall away, you can safely prepare your bowl.

Place a layer of fibre at the bottom of the bowl. Press down gently and then place the bulbs in position. Deep rather than shallow planting is preferable. The noses of hyacinth bulbs should be just visible above the level of the fibre. Daffodils and tulips can go slightly deeper, while crocuses, muscari and other smaller bulbs should not show at all.

When you have finished, the fibre should be about half an inch from the top of the bowl to allow for subsequent watering. There is no rule about actual spacing of the bulbs. Personally, I think that crocuses and most of the smaller bulbs should go fairly close together—say half an inch—as you are aiming at a mass of bloom, not specimen flowers. Daffodils, hyacinths and tulips should be allowed not less than two inches.

Plunging the bulbs, as the gardener calls this operation, is probably the most important task, as this encourages vigorous root action, which is essential before any top growth can take place. Bury the bowl outdoors, if possible at the foot of a fence or north wall, under about four inches of sifted ashes, damp peat or light soil. You can wrap newspaper round the bowls before covering with ashes, etc., to lessen discoloration.

A cool, dark cupboard can also be used; but it must be well ventilated, as draughts will almost certainly lead to mould in the fibre. Inspect your bowls twice a week; if the fibre is drying out, water but do not soak. Darkness is actually less important than moist fibre and a steady temperature—you can even start your bulbs successfully under the bed.

If you prefer to use pots, make certain that drainage is perfect by placing a layer of crocks at the bottom. You can plant in any good garden soil or compost, plus a little bone meal. Alternatively, John Innes No. 2 potting compost may be used. If you are utilising your own soil from the garden and it is on the heavy side, work in peat and sand to lighten it, thereby assisting quick rooting. Some people always put a pinch of sand directly underneath each bulb, but this is not essential.

Two beautiful bowls of hyacinths, photographed in a Dutch home

After five or six weeks or longer, depending on the size and variety of the bulb, your bowls or pots should be ready to move into a cool room. The correct time is when about an inch of top growth is visible, or two inches in the case of tulips. Allow only half-light for the first week or so, shading with newspaper, otherwise the bulbs may go blind, i.e. without a flower.

Directly the leaves are rich green, expose to the maximum light. Turn the containers round from time to time, otherwise growth will be lanky. Plunging bowls in a basin of water is easier than overhead watering, but stand any containers on their sides for a few minutes to drain off superfluous moisture.

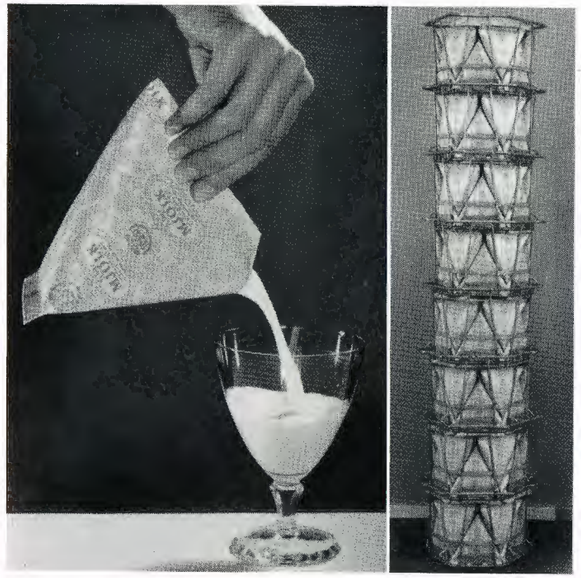
Hyacinths are among the easiest of spring-flowering bulbs. They are relatively expensive because they are slow of increase compared with most bulbs. Nurserymen make deep cross-cuts through the base of mature bulbs prior to planting, which encourages the production of bulblets. These take three years to reach flowering size.

Rosalie is the earliest hyacinth for flowering indoors. It is a pleasing pink, making a smallish bulb. Other good varieties for indoors include the deep crimson Jan Bos, the bright pink Lady Derby and the rich blue Grand Maître. If these large-flowered hyacinths produce side shoots, cut them at the base.

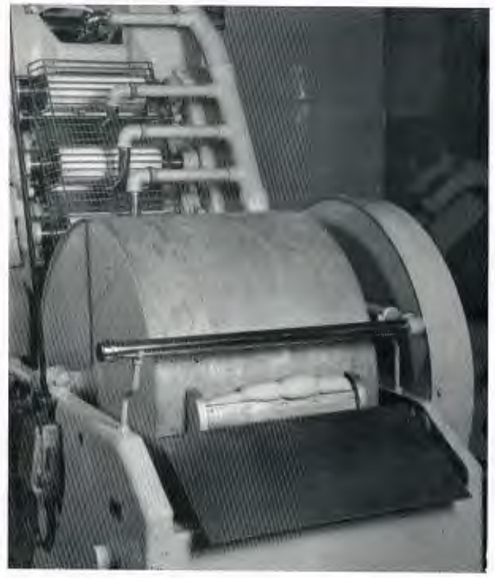
The large Dutch crocuses are equally fine for forcing except the Yellow Dutch, which fails miserably indoors. The species crocus are more elegant, the flowers being altogether more dainty, especially *Crocus Sieberi*, lavender-blue with a yellow base.

NEWS IN PICTURES

Canadian 'Terylene.' *C.I.L.'s* $22,000,000 *plant at Millhaven, Ontario, is now on stream. Textile manufacturers in Canada have already received limited quantities of the fibre from a pilot plant; the first collection of 'Terylene' garments was shown in May. Above: General view of the plant. Below, left: The Polymer building. Below, right: Entrance to the administration building. The plant at present employs about* 450 *people, but when fully operating the number employed will increase to* 800



Polythene milk *cartons, a Swedish invention, are expected to come into use here this year. Weighing half as much as glass bottles, their tetrahedral shape makes them easy to pack in special carriers. A new technique for coating Kraft paper with polythene was evolved jointly by Tetra Pak Co. Ltd. and Plastics Division*



Output of 'Fluon' (*polytetrafluoroethylene*) *is to be stepped up from* 25 *to* 200 *tons per year at a new Plastics Division plant at Hillhouse. The non-sticking property of 'Fluon' makes it useful for coating everything from bakery rollers* (*shown in the picture above*) *to skis*

Wilton transport *drivers save time and mileage by using R/T to receive their orders. Lorries* (*left*), *fire engines* (*centre*), *locomotives* (*right*) *and passenger cars all carry VHF sets, and can thus be diverted to new jobs while on the road. The Civil Defence and fire organisations can monopolise the R/T frequency during emergencies.* (*Story on page* 284.)

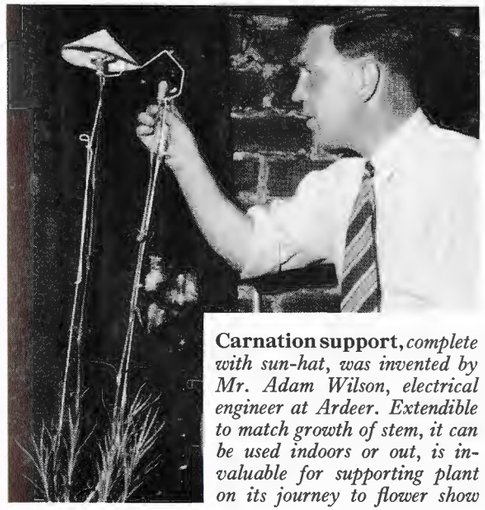
Nylon polymer, *seen here leaving the plant at Billingham, will reach an output of* 26,000 *tons a year with the building of large new plant at Wilton. Present output amounts to* 15,000 *tons from Billingham and* 1000 *tons from Huddersfield*

Africa House, *Ardeer, was scene of presentation by Mr. G. M. Mason (right) to Dr. James Craik of painting of "Old Cape Homestead." Picture was given by directors of A.E. & C.I. to those of Nobel Division, will hang in Africa House*

Latest picture *of Wilton, by Barnet Saidman of the "News Chronicle," shows the oil-cracking plant against the night sky*

Yalding cricketers *beat Fernhurst at Plant Protection's new Yalding sports ground.* (*Story on page* 283.)

I.C.I. scarf, *modelled here by Miss Ann Smith of Paints Division, is now available. Made of pure 'Terylene' in the I.C.I. tie design, it costs* 10s. 6d., *tax included*



Carnation support, *complete with sun-hat, was invented by Mr. Adam Wilson, electrical engineer at Ardeer. Extendible to match growth of stem, it can be used indoors or out, is invaluable for supporting plant on its journey to flower show*

Hybrid motor-cycle *combination was built by Mr. Bruce Hall, Wilton instrument artificer. Norton crankcase and Raleigh barrel and head form the engine; front wheel brakes were from Austin 7*

Mr. H. Hammond *won for Huddersfield Works bowling green the title of best-kept club green in Yorkshire, for himself a silver trophy and £*20 *cash. He also won the competition in* 1936 *and* 1951

I.C.I. NEWS

U.S.A. TITANIUM PROJECT

A NEW titanium plant may be built jointly in the U.S.A. by I.C.I. and an American company, Columbia-Southern Chemical Corporation of Pittsburgh.

The two companies have submitted a joint application to the United States Government for a contract under which the government would undertake to buy 5000 short tons of granular titanium metal a year. It would be produced by the I.C.I. sodium reduction process, which is new to the U.S.A., and Columbia-Southern and I.C.I. believe that their proposal would result in lower capital and production costs and would speed up titanium fabrication in the U.S.A.

If the contract is awarded, the companies will form a jointly owned subsidiary, Columbia Titanium Company, in which each will hold a 50% interest. The plant would be built at Natrium, West Virginia, and would cost in the region of $10,000,000.

I.C.I. already has considerable patent and process experience of titanium, extending from the production of granular metal by the new sodium process to fabrication. Columbia-Southern's contribution to the joint enterprise lies in the production of titanium tetrachloride, from which titanium metal will be made. They have been engaged in research on the chlorination of titanium-bearing ores since 1937 and have established a broad patent position in this field.

HEAD OFFICE

Mr. H. E. Lester

At the end of August, after 44 years with I.C.I. and its predecessors, Mr. Hugh Lester retired from the Australasian Department of Head Office. His 36 years' connection with I.C.I.'s Australasian affairs establish a record that is never likely to be broken. During that time his name has become a familiar one to hundreds of I.C.I.A.N.Z. people whom he has never met, and those whom he has met will remember how a kindly word of advice from him has helped them on their way.

Mr. Lester's first job was with the Nobel Dynamite Trust Co. Ltd., which he joined in 1911. After five years' army service, mainly in the Middle East, he came back to London to join Explosives Trades Ltd., soon to become Nobel Industries Ltd. He worked in the section dealing with associated companies and patents, and had particularly to deal with the Australian affairs of the constituent companies, such as Eley, Kynoch, Curtis and Harvey, and Bickford Smith. In those days Australian Explosives and Chemicals Ltd. was the manufacturing unit in Australia.

Mr. H. E. Lester

Since those days he has seen the formation of I.C.I. and I.C.I.A.N.Z. and the growth of both companies to positions of great strength and prestige. Furthermore, he has made his own valuable contribution to the spirit of co-operation between the two companies.

Mr. Lester is a man with many and varied interests, including rifle shooting, stamp collecting (specialising in Australian issues), bowls, and latterly European travel. His eldest son now lives in Christchurch, New Zealand, so perhaps one day he may visit the countries to which so much of his working life has been devoted.

ROSPA Office for Mr. H. R. Payne

Mr. H. R. Payne, head of the Safety Department, has been appointed chairman of the National Executive Committee of the Royal Society for the Prevention of Accidents. He succeeds Sir Howard Roberts, who now becomes president of the society.

Mr. Payne invests the president of ROSPA with his chain of honour

This is the first time that the honour has been bestowed on an industrial safety officer and is a recognition of Mr. Payne's many voluntary services to the cause of accident prevention generally.

He was awarded the O.B.E. in 1952 for his services to industry.

ALKALI DIVISION

First-aider's Exploit wins Certificate

Saturday, 16th July, was a day to remember for Miss Pamela Singleton, 19, shorthand-typist of the Secretary's Department, Winnington. For on that day she received from Princess Margaret the Cadet Meritorious Certificate at a parade of St. John Ambulance and Nursing Cadets at Southport.

The story really began late one night last October, when Pamela was awakened by a car crash not far from her home. She put on a dressing gown, picked up her first-aid haversack, and, pausing to tell her family to telephone for the police and ambulance, hurried out through the rain to the scene of the accident.

A woman was lying half out of the car, unconscious and bleeding from the mouth. Pamela treated her for shock, then, leaving the woman in the care of Mrs. Singleton, who by this time had joined Pamela, she went to help a man lying under the car. He was just regaining consciousness. Pamela found he had a fractured leg. She treated him for the fracture and for shock. She returned home only after seeing both casualties carefully placed in an ambulance.

(Photo: Warwick Picture Service)

Princess Margaret presents the Cadet Meritorious Certificate to Miss Pamela Singleton

Pamela, whose mother is Cheshire County Secretary of the St. John Ambulance Brigade, formed the Knutsford Cadet Nursing Division in 1952. Since then Pamela and her cadets have manned first-aid posts at several local shows and gymkhanas.

Early Winnington Bowlers

The publication in the April issue of the *Magazine* of the Winnington Works champion bowls team of fifty years ago struck a chord in the memory of Mr. Gus MacKenzie, North Area Day Foreman at Winnington, whose father was in the group.

Mr. MacKenzie produced the photograph shown here

Mr. MacKenzie's father is on the extreme right of this picture

—once one of his father's proudest possessions—which, he claims, was taken five to ten years before the picture published in April with Mr. Wilkinson's article.

He backs his claim with the fact that five of the men shown on his picture, including his father, appear much older in the photograph published in April.

BILLINGHAM DIVISION

Poems in Three Languages

A slim, blue-covered book of poems in English, French and German which has recently reached the bookshops is the work of Dr. Julius Willenz, of the Intelligence Section of Billingham Research Department.

Dr. Willenz, who also speaks Polish and Russian, was born in Austria and attended universities in Munich, Breslau and Zürich, and in 1934 he came to England, where he gained a B.Sc. from St. Catherine's, Oxford. He also gained a Ph.D. (Oxon) degree.

Although he has lived in England since 1934, having been with I.C.I. for the past six years, Dr. Willenz likes travelling, and several of his poems were written abroad. One of these was written in Algeria, which he visited last year.

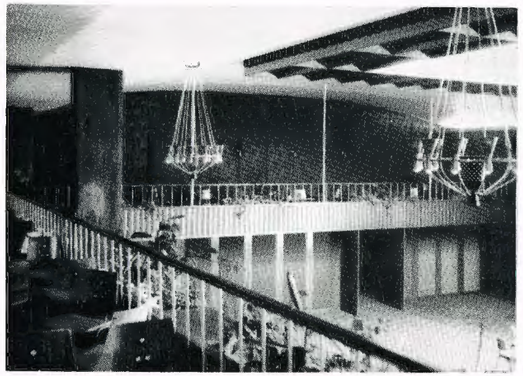
Several of his poems show his appreciation of music, while others make fun of people he has met. The latter include a poem in English written about a nurse in an Oxford hospital who was known for her cold hands, called "Rapper's Hobby."

Kaleidoscope is published by Arthur H. Stockwell Ltd.

LEATHERCLOTH DIVISION

'Vynide' Galore

Britain's largest post-war hotel, the Hotel Leofric in Coventry, is in one sense a home-from-home for



The ballroom of the Hotel Leofric. The balcony and the screen below are panelled with padded 'Vynide.'

Leathercloth Division. To quote a sales representative, "the place is literally dripping with 'Vynide'."

More than three-quarters of a mile of 'Vynide' have actually been used in the hotel, which has been designed in the contemporary manner and cost £800,000 to build and equip. 'Vynide' from the standard range of contemporary designs and colours has been used for upholstery, padded and flat panelling, wardrobe doors, chairs, door-handles and columns, and should provide a continuous reminder of the versatility of this product.

METALS DIVISION

Right First Time

Five members of the staff at Summerfield Research Station had an exciting day on 25th June. They were the coach and crew of the Works Four competing at Stourport Regatta for the Capt. Hopcraft Vase. As only one member of the crew had had any previous experience of rowing, and as training had been telescoped into one month, colleagues at Summerfield were a little sceptical. However, the critics were confounded when the Summerfield crew easily beat the present holders in the first heat, left a Steatite and Porcelain Products boat three lengths behind in the second heat, and finished half a length ahead in the final.

Prime mover in the enterprise was Mr. J. Traylor, who was enthusiastically supported by Messrs. G. S. Lewis, S. Kettle, J. Fereday and R. Barnes (left to right in boat).

The victorious Summerfield coach and crew

Model Pilot

For the third time since 1949 Mr. F. Holland, an assistant work study officer at Waunarlwydd Works, has won a place in the team to represent Great Britain in the international Wakefield Cup competition for rubber-driven model aircraft.

The final elimination trial was held at the R.A.F.

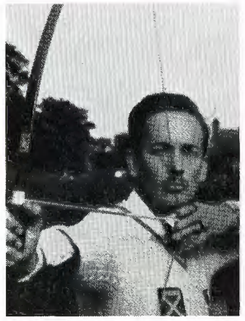
Mr. Holland with one of his model aircraft

station, Odiham, on 18–19th June, when Mr. Holland had the highest aggregate time in five flights. The team will represent this country in the American Sector in Germany on 8–9th September.

NOBEL DIVISION

Master Bowman

When he won the Low Challenge Cup at Dundee on 10th July Mr. David Anderson, Research Engineering, Ardeer, became the holder of every archery award in Scotland. Six cups, two silver arrows and three shields at his home in Troon illustrate this achievement.



Mr. David Anderson

For an archer of only three years standing it is a remarkable feat. Within a year of taking up the sport he became the first master bowman in Scotland—the highest award of the Scottish Archery Association. This success he repeated last year and again in 1955.

So far this year Mr. Anderson has won four awards and successfully defended one. Ahead of him lies the task of defending his remaining titles—six in all.

A distinction he is hoping for this year is to be included in the Scottish international team which meets Ulster at Belfast. Last year he captained the team, and as a master bowman he has a good chance of being chosen again.

In this series Scotland lead by three matches to one.

If he qualifies as a master bowman next year an even more attractive prospect will lie ahead—the possibility of being chosen for Britain's Olympic team. All master bowmen will be invited to shoot against each other in an eliminating contest.

Three Gallant Rescues

Nobel Division employees figured prominently in three successful rescues from drowning during the heat wave.

Westfalite Factory brothers Mr. Fred and Mr. Joseph Dudhill intended to visit their widowed mother one evening after the factory closed. On the way, however, they were called to rescue a boy who had fallen into the canal at Mexborough. The boy was drowning. Joseph dived in, found the lad, and brought him to the canal bank. Both Fred and Joseph, who are skilled in first aid, then started to give artificial respiration, and after about fifteen minutes the boy began to recover. He was removed to hospital by the police and was kept there, but was soon pronounced out of danger.

Both Fred and Joseph hold medallions for life-saving, and both are members of Westfalite Civil Defence organisation.

Hero of the second rescue was Mr. Duncan Fisher, a locomotive driver who heard screams of children coming from the opposite bank of the canal which runs alongside St. Rollox Factory. He ran some 200 yards to the west end of the factory and had to climb a 10 ft. high gate before he could cross the bridge of the canal to the bank, where agitated children were shouting for help. He was able to rescue a young child who had fallen into the water. Mr. Fisher is a non-swimmer.

Hero of another rescue was Mr. John Lindsay of Dumfries Factory, who rescued a little girl from drowning in the river Nith. Mr. Lindsay was walking on the jetty at Glencaple as a 7-year-old girl was bathing. She was carried away by the current and got into difficulties. She had disappeared under the water before he could dive in, but he had noted the spot where she was last seen. Diving into the water, he managed to find her near the bed of the river. With the help of another man Mr. Lindsay brought the girl to the river bank. She was unconscious, but revived after artificial respiration.

PLANT PROTECTION LTD.

New Sports Ground Opened

Plant Protection Ltd. now has a nine-acre sports ground at Yalding for the benefit of employees and their families. It was officially opened on 24th July by the I.C.I. Sales Controller, Mr. E. M. Fraser, C.B.E., who is also chairman of Plant Protection Ltd. Visitors from Fernhurst and Bolton House were among the 300 people present, and included many of the directors of Plant Protection Ltd. and their wives.

Mr. E. M. Fraser opens the Yalding sports ground

Mr. Fraser paid special tribute to Mr. Jim Holmes, the works engineer, who was responsible for the many structural operations involved in planning the sports ground. The ground is on the site of a derelict orchard, and came into existence largely through the inspiration and enthusiasm of Mr. R. C. Stotter, Yalding General Manager. He received the greatest encouragement and practical assistance from the Yalding social committee under the chairmanship of Mr. H. C. J. Woodrow and from the sports ground sub-committee. Already there is a cricket pitch, two tennis courts and an eighteen-hole putting course, and it is hoped eventually to provide a football pitch, bowling green and running track.

The first cricket match was played on this occasion between Yalding Works and the Plant Protection Fernhurst Research Station, resulting in a victory for Yalding by three wickets. The captain of the winning team was presented with a cup by Mrs. E. M. Fraser, who announced that a similar trophy would be given in future years for tennis. Yalding also won the first tennis tournament by 8 matches to 1. (*Picture on page* 279).

PLASTICS DIVISION

Fourteenth-century Find for Welwyn

One of the youngest Divisions in the Company is soon to have one of the oldest "centre-pieces" in the Company. A 14th-century sundial discovered by Dr. F. T. Hamblin, Manager of Sales Control Dept., at his wife's parents' home in Chedworth, Gloucestershire, is to be mounted in front of the main building at Welwyn as soon as the temporary huts at present standing there are demolished.

Dr. Hamblin noticed in his father-in-law's garden a block of stone completely covered with moss and lichen. After cleaning, it proved to be a three-sided sundial of unusual design. Family tradition has it that the stone was

Old "centre-piece" for a young Division: a fourteenth-century sundial

taken from the nearby ruined church of St. John the Divine many years ago.

The metal gnomons for the three sides were missing, and temporary ones have been made by Mr. P. H. Hull of Technical Department. When the accuracy of these has been confirmed, brass gnomons will be made by Mr. Mayhew of Engineering Department.

WILTON WORKS

Radio Speeds Wilton Transport

A visitor to Wilton arrived at Middlesbrough station and telephoned the works to ask for transport. By the time he had put down the receiver, collected his briefcase and stepped outside the phone booth a car was waiting at the kerb.

This kind of magic is being worked every day at Wilton, thanks to the use of radio-telephones in a large proportion of the road transport fleet. (*Pictures on page* 271.) Twenty-three passenger vehicles, twenty-three locally employed lorries, two fire appliances and one ambulance (as well as two locomotives) are fitted with VHF sets and receive their orders from control rooms at the Wilton site. By using R/T, lorries and cars on the road can be diverted to pick up passengers or freight which would normally have had to wait for another vehicle to set out from the works, and savings in time and mileage have been considerable.

R/T was first installed at Wilton to provide communications for the site's civil defence organisation, which includes the fire engine, foam tender, ambulance, and 300 men trained to use walkie-talkie sets. Later the system was extended to include the passenger vehicles and local lorries. In emergencies the control room at the fire station takes over the R/T frequency completely and the transport vehicles go off the air.

Most of the advantages of using R/T on a site such as Wilton, where a widely scattered distribution of freight is necessary and where as many as forty visitors may have to be brought in from stations and hotels between 9 and 9.30 a.m., are obvious. But some incidental advantages have turned up.

Recently, men working in the site's main drainage culvert were warned by a man with a walkie-talkie of any sudden dumping of chemical effluent from the works which might have injured them. He was in touch with the transport control room, which could keep in contact with the various works by telephone. It has even been possible for maintenance workers to use walkie-talkies for a certain distance down the tunnel which connects Billingham and Wilton beneath the Tees. R/T communication is also used when repairs are being carried out to Wilton's water supply pipes and valves miles apart have to be opened or shut together.

The main aerial is on top of the power station: it can transmit and receive signals over a distance of 25 miles.

I.C.I.A.N.Z.

Best Annual Report

I.C.I.A.N.Z. have won the award of the Australian Institute of Management (Sydney Division) for the best annual report for 1954.

Page from the I.C.I.A.N.Z. report

This year, for the first time since its inception five years ago, the selection was made from all public company annual reports published during the year. Presenting the award, the chairman of the adjudicating panel said: "The award is won by a company which has richly earned it—a company which has shown itself particularly enterprising in the fields of production and merchandising—and now it has distinguished itself in the field of account reporting."

Another member of the adjudicating panel described the report as "not a glamorous one; but it was presented in such a manner and showed such a wealth of data and information, that it left little to be still desired."

I.C.I. (FRANCE)

Mr. G. Vandysdadt

Mr. G. Vandysdadt died on 8th July. He joined S. H. Morden & Co., predecessors of I.C.I. (France) S.A., in January 1936, and his death at the age of 58 ended a period of nearly twenty years of loyal and efficient service with our French associates.

As head of Northern France's regional sales office at Tourcoing Mr. Vandysdadt was well known to all those concerned with the French market, and they will retain grateful memories of his kindness and gentleness. Proud of his association with the Company, he was a keen defender of the I.C.I. family spirit, and his colleagues are mourning a friend always ready to help and unable to think unkindly about anyone.

Always closely connected with the textile industries of northern France, Mr. Vandysdadt's experience of all technico-commercial problems concerning the dyestuffs trade contributed to a large extent to the favourable development of I.C.I.'s position in this part of the Continent.

Mr. Vandysdadt leaves a widow and three children.

MAC

By Eileen Norcross (Trimpell Ltd.)

Illustrated by James Holdaway

I FIRST taught myself to ride, in a rough and ready fashion, on the ponies which give children rides on the beach. Soon I began to want more. I decided to go to a local riding school, and eventually, as my riding improved, I started show-jumping for Mr. Sawford, the proprietor. Though I did not win very much, I always enjoyed every minute of it.

After a year of jumping my thoughts turned to racing. Here I was more successful, and I rode one or two winners besides a number of seconds and thirds. Although I began with Mr. Sawford I also rode for many other owners, and I was very often in pocket after a race meeting.

However, I did not ride for the money they paid me. I rode for the sheer joy of it, the thrill of racing, the eager animal beneath me throwing every effort into the great strides, green turf flashing away from the pounding hooves, and the excited racegoers cheering wildly as the horses pass the post.

In spite of the thrills of racing, I still yearned for a pony of my own—a pony I would love, and which would grow to love me, a pony which would be my very own. At last, when I was 16, I realised I could wait no longer. Determinedly I took a job at a theatre as an usherette and began saving in earnest. I had just left school and was helping my mother during the day and working every evening. By the end of the season I had saved £33, and on Tuesday, 13th October 1953, I went to Kendal horse sale with Mr. Sawford and bought for £21 Mac, an unbroken two-year-old Dales pony.

I immediately started his training by getting him accustomed to my presence. At first he was difficult to catch, but his inquisitiveness and friendliness got the better of him and soon he would come trotting up to me, whinnying as soon as I opened the gate. He was quick to learn, and he soon understood what the bit was for as I drove him round the field and lanes on long reins. When I first mounted him, he stood quite still and did not offer to buck or rear or fight in any way.

I was soon riding him on busy roads, and everywhere he behaved perfectly. I had won his love and trust, and of all the horses and ponies I have known, I have never known any with such a sweet disposition as my Mac.

He had only one real fault: he seemed to be a bit of a wanderer. I could never keep him in one field for any length of time.

The first field he was in was only small, though it was quite full of good grass; but Mac did not stay there. Oh no! First he got into another field and then on to the road. This final escapade of his left me with no alternative but to move him. I put him in another field—quite a good one—but he pushed his way through the fence into a farmer's field.

The odd thing about it was, he never had a mark on him, even though he had broken through barbed wire in several cases. My friend and I spent hours knocking posts in, but in the end he had to be moved again. This time I had his shoes removed and turned him out for the rest of the winter with a big black carthorse. He was perfectly happy, as there were at least six fields in which he could wander. The gateways were open, and he could go in and out of them all as he pleased.

By the time spring came round and Mac was losing his long, shaggy coat and replacing it with one like black shiny satin, I realised I wanted him nearer home so that I would be able to ride him more often in the evenings. I managed to rent a field and Mac changed homes once more.

We had an enjoyable summer, even though the weather was not very kind. I managed to buy a secondhand trap. My friend Pat and I thought we would break Mac in to harness ourselves, as he had been so quiet during his first training. But we were surprised. The first time a set of harness was put on him he became frightened, succeeded in getting free and ended up by kicking off all the strange offending straps and buckles.

Still, we were not discouraged. We persevered a little longer, leading him round quietly, getting him used to the rattling and flapping of a loose harness.

We realised that when fastened to the trap the harness would be tightened up and there would be less chance of his being upset, but we took our time with him.

One Sunday morning we decided to put him to the test. We first backed him between the shafts, but did not fasten him to it to start with. He was very good, even when we pulled the trap along behind him as we led him forward. We thought everything was going to be easy and straightforward when Mac suddenly got free again and galloped round and round the field, bucking and twisting in his efforts to get the harness off.

This time he was unlucky, and eventually he slithered to a stop in a corner, sweating and shaking. He was really scared and needed a lot of petting and soothing before he quietened down. We now had to admit that breaking a strong-spirited pony to harness is no job for two young, inexperienced girls.

Naturally we were disappointed, but a farmer we knew, a Mr. Gardner, for whom I had raced many times, offered to take Mac to his farm and break him properly. I was delighted, especially as Mr. Gardner promised to take us and Mac to a gymkhana before Mac went home with him.

He called for us with his horse-box containing another pony which his son, Brian, rode. We had quite a good day and Mac behaved really well, even though it was his first show.

I took him in the showing class first, but did not win anything as I expected, as he was not schooled enough. Besides, he was not a show pony. I also entered him in the jumping, as we had often practised over bushes and ditches at home, but he was very green and we did not get over even the first bush. I did not scold him, as it would not have been fair; but afterwards, when the show was over and the jumps were left up, he did a clear round. In the potato race he did extremely well and we were in the lead, but I let him down by dropping my potato.

At the end of the day Mr. Gardner took Mac home with him, and I must admit I was sorry to see him go, even though I knew it was for my benefit and he would be back very soon.

After a week I had missed Mac so much that Pat and I cycled the twenty miles to Mr. Gardner's farm, and I was overjoyed to see my pony again. He looked exceptionally well. His coat was smooth and shiny, and he seemed in perfect condition. He held his head up and fairly bounced with health. I wished then I lived on a farm so that Mac could have the best of everything and always look as he did then.

Mr. Gardner said that he had been good to break and Brian had been harrowing with him. He promised to bring him home the next day, and as we cycled back I was looking forward to the time when I would be able to drive out in my pony and trap.

When Mac was harnessed to the trap he did everything he was asked, and it was not long before Pat and I and our dogs were enjoying quiet drives round the country.

As the summer passed Mac grew more and more friendly as he became "one of us." He was included in all our plans, and we determined that the following summer we would go camping for week-ends in the trap.

At the approach of winter I began to wonder where I would keep Mac, as his present field was definitely not sufficient to feed him. My thoughts were speeded up, but not of my own free will, when Mac yet again broke out of his pasture and spent a most profitable night on some neighbouring allotments.

This time I thought I was lost. I had nowhere to turn to. But then Tom Gardner, Mr. Gardner's eldest son, saved the situation by offering to take Mac to their farm until I found somewhere else.

While Mac was in their good hands, I was busy thinking where I could keep him when another farmer I knew said I could winter him out on his farm at Bentham. Even though it was a long way, I thought it was the best thing to do. It was good pasture, and I probably would not be able to ride much in the bad weather even if I had him at home. So Mac was sent to Bentham and immediately settled down to the plentiful grazing and restful life. I did not see much of him but I was informed about him frequently, and he seemed to be quite content.

As I had not yet taken all my holidays from work, I decided to have them in November and bring Mac over for the week so that I could ride while on holiday. I caught the bus to Bentham early one morning and rode him back to Morecambe, a distance of about sixteen miles. Although he was tired, naturally, he had done very well, and I was justly proud of him. I kept him inside just for that week and had a pleasant holiday, riding him every day and looking after him in the stable.

Mac had never been kept in before and it was all very strange to him. All the time he was in he did not once lie down. I was a little worried, but I was told it was quite usual at first.

One day we had been out and we both had got wet after being caught in a shower. When I got him back to the stable, I watered and fed him and then rubbed him down. The next day, when we were setting off for our usual ride, Mac seemed a little bit stiff. But it soon wore off and I put it down to his not lying down at all.

The first time a set of harness was put on him he became frightened

The following day, however, he was considerably worse and could only walk with difficulty. Several men gave different opinions. Then Tom came to see him. He immediately diagnosed laminitis—fever in the feet—a dreaded and serious disease caused by a chill which travels down to the feet, hardening the blood vessels and causing severe lameness. I realised he must have caught the chill with standing still in the stable after he had been wet.

Tom took Mac home with him and called in the vet. The vet said it was quite serious, but he should recover. He gave him injections of penicillin. I was most relieved when I heard this news, as I had been terribly upset by it all, because Mac had always been perfectly healthy.

Gradually he improved and we were planning to take him back to Bentham, when, distressingly, he took a turn for the worse. This time he seemed to become worse than ever, but still I hoped and prayed.

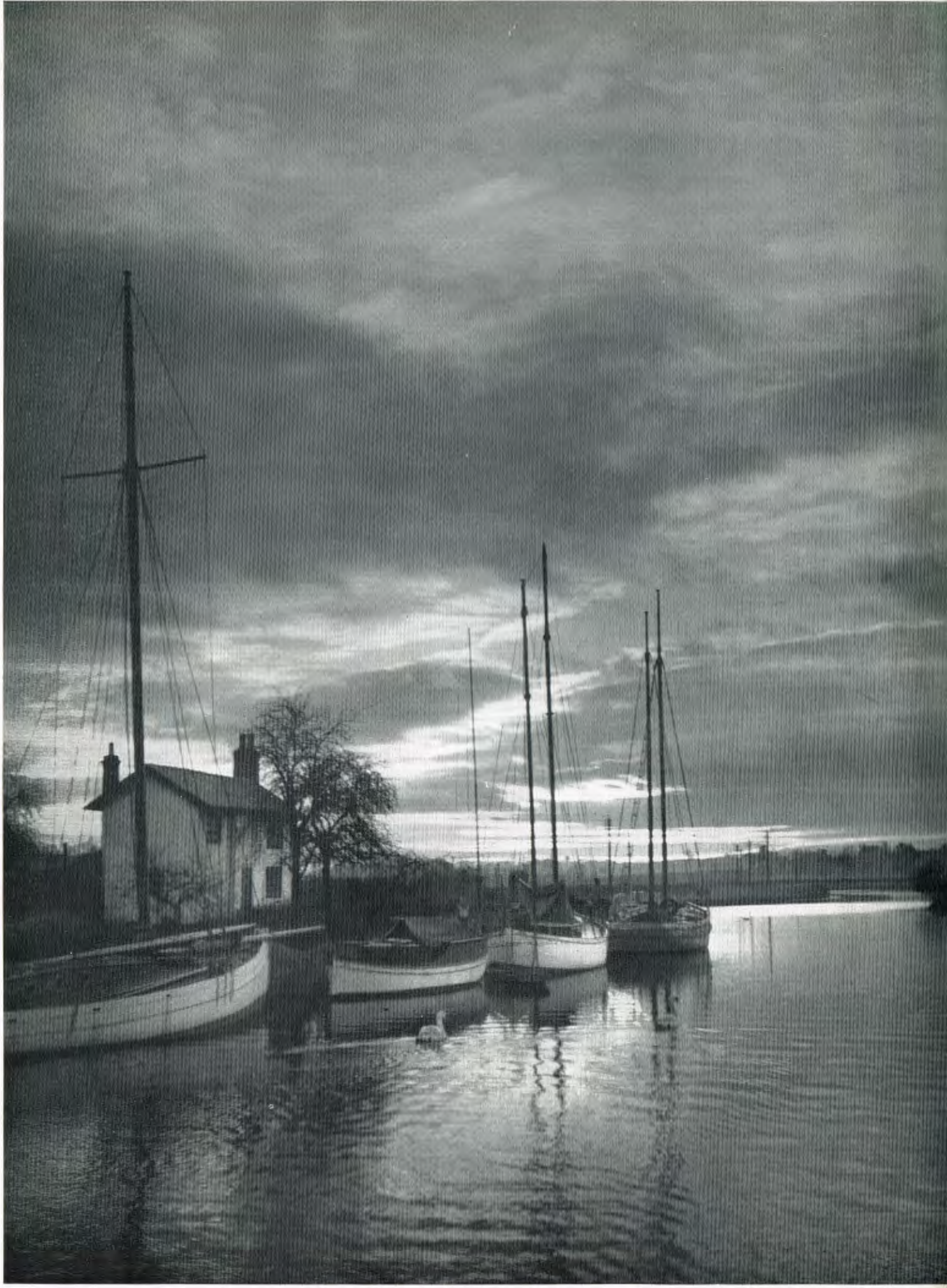
Then the blow fell. Tom said Mac would not get better and that my pony, my own precious pony, would have to be shot. At first I could not believe it, but all doubt vanished from my mind when I went to see him.

He was lying down when I went up to him in the stable and he seemed just the same old Mac, whinnying softly and nuzzling in my pockets. I began to wonder if he was really as ill as he was supposed to be. He certainly did not show it, except that he was thinner and his coat was out of condition.

Then he stood up. I could hardly bear to watch as he struggled to his feet, back legs first like a cow. He swayed about on his knees for a long time, not being able to put any weight on his poor crippled forefeet. Then he half-reared and stood up, unsteady, front feet placed forward, standing on his heels.

Tom moved him over in the stall, but it took him such a long time to shift his weight from one foot to the other that I spared him any more unnecessary pain and went to his head. Even then he was still my Mac, friendly, inquisitive, nibbling, blowing, pricking his ears. If he had looked as if he were at death's door I would have been more prepared to put him out of his misery. But here he was asking for titbits, just as he used to when he came cantering across the field to welcome me, a happy, healthy pony. And now? Oh, it was too cruel! Why had this to happen to my Mac?

The slaughterer destroyed Mac in his own horse-box. Tom did not watch, but he heard a little bang, and it was all over. My own darling pony was gone for ever.



"Sunset"

Photo by S. Pollard (Alkali Division)